# White Paper

# W900

**Sony Ericsson**

# Preface

## Purpose of this document

This White Paper will be published in several revisions as the phone is developed. Therefore, some of the headings and tables below contain limited information. Additional information and facts will be forthcoming in later revisions.

The aim of this White Paper is to give the reader an understanding of technology and its main applications, as well as the main functions and features of the phone.

**Note**: This document contains general descriptions for this specific Sony Ericsson mobile phone.

People who can benefit from this document include:

- Operators
- Service providers
- Software developers
- Support engineers
- Application developers

# Sony Ericsson Developer World

On www.SonyEricsson.com/developer, developers will find documentation and tools such as phone White Papers, Developers Guidelines for different technologies, SDKs and  relevant APIs. The website also contains discussion forums monitored by the Sony Ericsson Developer Support team, an extensive Knowledge Base, Tips & Tricks, example code and news.

Sony Ericsson also offers technical support services to professional developers. For more information about these professional services, visit the Sony Ericsson Developer World website.

# Contents

# Product overview

The W900 is a powerful entertainment machine which holds the latest in 3G technology such as voice and video telephony. It has a swivel action form factor and is full of nuances including an advanced music player, FM radio, 3D gaming, 2.0 mega pixel camera and much more. The W900 has an internal user-free memory of 470 MB with an extra slot for memory sticks supporting up to 2 GB. Most usability is in closed mode and when needed, quick access to the ergonomic keypad is possible with the automatic swivel function for fast texting, typing in phone numbers or searching for particular songs or artists.

Easy access to 3G services can be maintained by the use of the direct button for video calling on the front of the phone and the high speed offered through 3G, facilitates multitasking. It is possible to, for example, talk and browse the web, talk and send messages, pictures or video clips, talk and download music or stream videos.

W900 is a WALKMAN™ phone, where musical elements are present throughout. An advanced digital music player, enabling instant and easy access to favourite tracks with just one press on the WALKMAN™ key. Using the Navigation keys, a music track is instantly played or paused, or swapped for another, with ease. W900 is a multitasking phone, enabling the use of other applications while continuing to listen to favourite tracks.

The advanced music player or FM radio can be controlled by using the Radio Portable Handsfree which is provided in the kit or by using the music player buttons below the screen. The W900 radio transmitters and receivers can be inactivated, making it possible to use the phone only as a WALKMAN™ in airplanes, hospitals, and other situations where using a mobile phone as not allowed. The W900 can also be used with other music headsets (standard 3.5 mini-jack interface).

A graphically attractive large 2.2 inch 262k TFT colour screen accommodates a user-friendly atmosphere together with high-performance technology. For synchronisation or transferring files between the phone and a computer, a USB cable is provided in the kit.

**Note:** To provide updated information about the implemented technology and functionality of this product, this White Paper will be released in updated revisions.

# Key features

### 2.2 inch colour screen
The large 2.2 inch (240x320 pixels) full graphic QVGA 262k colour screen enhances viewing, facilitating high-quality multimedia and entertainment.

### 2.0 Mega pixel camera
There are two built-in cameras in the W900. With the 2.0 Mega pixel camera on the back of the phone which includes 8x digital zoom and auto focus, taking pictures becomes easy and fun. The horizontal user interface adds extra usage quality when it comes to handling the camera. The camera on the front of the phone is intended for videocalls and taking self-portrait pictures.

### Built-in LED flash light
Lighting conditions can be enhanced by using the built-in LED flash light which is easily started by sliding the LED flash light slider key on the side of the phone. The light can be set to On, Off or Auto.

### MXE-60 flash
The MXE-60 flash offered as a supporting accessory and is easily connected to the Fast port.

### WALKMAN™ player
The WALKMAN™ player converts the phone into a portable MP3, MPEG4, Real®8 and H263 player. Play music and video clips, streamed or down-loaded. The folder system enables you, for example, to organize your favourite songs into groups and create simple playlists. The WALKMAN™ key gives you direct access to you music files without having to browse the menus.

### Communicorder
By using the built-in communicorder, a video recording can be captured and stored in the phone or on the memory stick. A video clip can be shared as a picture message with friends or family. The phone also supports QVGA size (full screen) 30 fps video recording, playback and streaming.

### Video call
When entering video call mode by pressing the video call key or via the desktop menu, the CIF camera at the front of the phone is activated.

### Disc2Phone software

You can create your own playlists and albums and transfer them to the phone. Music files can be transferred from a computer to the phone by using Disc2Phone software. Search for and select music on your computer or audio CDs and convert your existing audio tracks to MP3 format. Disc2Phone software will be included on the CD in the box.

### PlayNow™

Content such as music, video and images may be previewed before purchase. A unique direct-link to download music, video, games, themes and images, which is easy to use and promises you best-selling content for mobile download. By selecting PlayNow™, you can, for example, go straight to a live list of Top Music Hits.

All formats that are supported in the phone will be possible to download. Music, video and images may be previewed before purchase. The music format is MIDI, MP3, MP4, Real8 or WAV (Polyphonic 24 voices or more).

### FM Radio

The FM radio is built-in to the Radio Portable Handsfree and offers instant and easy access to FM radio channels. Just plug in the handsfree and start listening to desired music.

### Radio Portable Handsfree with remote control functionality

The WALKMAN $^{TM}$ and the radio can be controlled with the Radio Portable Handsfree. The portable handsfree has Play/Pause, Volume up/down, FF/next song or station and REW/previous song or station. Calls can be received while listening to music.

### Gaming

Gaming is a very popular feature in mobile phones, and with Java™, users can download new games and skill levels to further enhance the entertainment experience. Several embedded games are included in the phone at purchase.

### HTML web browser support

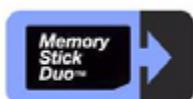Browse the Internet and look at the web sites in a different way with Access NetFront 3.3 – An HTML browser which supports a complete web standard suite.

### Java™

Download additional applications which are, for example, information- and entertainment- based. This gives users a chance to personalize the functions and features in their phones, and developers the opportunity to create new applications.

### Memory Stick™ Duo slot

W900's memory slot supports Sony Memory Stick PRO Duo™ and the Memory Stick Duo™. Different kinds of content (pictures, audio, video clips etc.) can be stored on the Memory Stick, and transferred to other Sony Memory Stick-compatible consumer products, for example Sony digital cameras, camcorders, portable music players, TVs, photo printers and computers.

### Bluetooth™ wireless technology

Several devices (simultaneous Bluetooth connections) can be connected to W900 using Bluetooth wireless technology up to 10 metres away. For example, the phone can be answered with a Bluetooth headset, when it rings and images can be sent to another phone at the same time. Several mobile phones can take part in a Bluetooth supported game and the phone and a computer can exchange data such as images, video clips, business e-cards, music files and calendar data. W900 supports Bluetooth version 2.0.

### Personal Information Management (PIM)

Stay up to date with everyday events by synchronizing phone contacts, calendar appointments and tasks in the phone with similar programs in a computer. The USB-cable which comes with the phone, the built-in Infrared or Bluetooth feature can be used together with the synchronization software which is available on the CD in the kit or can be downloaded from www.SonyEricsson.com/support.

# Images

# Technologies in detail

This chapter offers a detailed description of the technologies available in this product.

# Functions and features

The following table is a complete description of the features in W900. It also compares the product with two other Sony Ericsson products.

| Feature | W900 | K600 | W550 |
|---|---|---|---|
| **3D games** | X | X | X |
| **3D hardware accelerator** | X | | |
| **3G Enabled**<br><br>Technology that enables 384 kbps data transfer and video telephony. | X | X | |
| **Activity Menu**<br><br>The user can easily handle missed calls, new text and picture messages, task reminders, shortcuts and get quick access to favourite Internet bookmarks. | X | X | X |
| **Alarm clock**<br><br>Set a time for simple or recurring weekly alarms. | X | X | X |
| **Autofocus**<br><br>The camera automatically focuses on the subject in the focus area in the center of the screen/viewfinder. | X | | |
| **Backlight display**<br><br>Blue or other colored backlight to illuminate the phone screen. | X | X | X |
| **Battery** | 3.6V, 900mAh, Lithium Polymer and Li-ion | 3.6V, 900 mAh, Lithium Polymer or Li-ion | 3.6V, 900 mAh, Lithium Polymer or Li-ion |
| **Battery charging time** | At least 90% charged within 2 hours. Fully charged within 2.5 hours. | At least 90% charged within 2 hours. Fully charged within 2.5 hours. | At least 90% charged within 2 hours. Fully charged within 2.5 hours. |
| **Bluetooth™ wireless technology**<br><br>Wireless connectivity between devices. Range - up to 10 meters. | X | X | X |
| **Business card exchange**<br><br>Exchange contact information. | X | X | X |

| Feature | W900 | K600 | W550 |
|---|---|---|---|
| **Calculator** | X | X | X |
| **Calendar** <br><br> Calendar with day, week and month views and reminders. | X | X | X |
| **Call list** <br><br> View calls made and calls received. | X | X | X |
| **Camera** | 2.0 Megapixel | 1.3 Megapixel | 1.3 Megapixel |
| **Camera button** <br><br> A dedicated camera button. Press once and the integrated camera activates. | X | X | X |
| **Chinese input method** <br><br> Chinese input methods: Text input methods based on Simplified or Traditional Chinese. Bopomofo, Pinyin or Stroke. | X | X | X |
| **cHTML** <br><br> A mobile device adapted version of the standard Internet communications protocol HTML. | X | X | X |
| **Clock** <br><br> Onscreen clock that keeps time even when the phone is off. | X | X | X |
| **Co-branding area** | 22 x 8 mm | 6.5 x 20.5 mm | 7.25 x 23 mm |
| **Code memo** <br><br> A safe place to store all PIN codes and other information. To access Code memo, only one PIN code is needed. | X | X | X |
| **Colour** | Black or White | Aluminium Silver | Universe Blue, Orchid White, Vibrant Orange |
| **Contacts** <br><br> Phone book with fields for name, phone and fax numbers, e-mail address, street address, company, title. | X | X | X |
| **Conference calls** <br><br> Support for multi-party calling. | X | X | X |

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| Feature | W900 | K600 | W550 |
|---|---|---|---|
| **Content online**<br><br>Downloadable pictures, games, themes, ringtones available online. | X | X | X |
| **Copyright protection - DRM**<br><br>DRM (Digital Rights Management) features the rights and copy protection of downloaded content (audio, pictures, music tones, video, entertainment features such as games, Java applications etc.). | X | X | X |
| **Cyber-shot camera menu**<br><br>Easy-to-use horizontal digital camera menu. | X | X | X |
| **Design** | Swivel action dual front | Dual front | Swivel action dual front |
| **Device Management (DM)**<br><br>DM utilizes GPRS as bearer (basic network connectivity needs to be in place) of the provisioning data and allows the operator to access the phone and check and set different settings such as Network connectivity (GPRS), email, MMS, WAP and Java™. Device Management is achieved by supporting Over The Air provisioning 7.1 (OTA), OMA Client Provisioning 1.1 (CP) and OMA Device Management (DM) 1.1.2. | X | X | X |
| **Digital zoom** | 8x | 4x | 4x |
| **Display**<br><br>Type:<br>Size:<br>Resolution:<br>Technology:<br>Colours displayed together:<br>Backlight colour: | Full graphical<br>2.2 inches<br>240 x 320 pixels<br>TFT, QVGA<br>262,000 (18 bit)<br>White | Full graphical<br>1.8 inches<br>176 x 220 pixels<br>TFD<br>262,000 (18 bit)<br>White | Full graphical<br>1.8 inches<br>176 x 220 pixels<br>TFT<br>262,000 (18 bit)<br>White |
| **Display Sleep mode**<br><br>A power saving feature that minimizes battery power consumed when the phone is in standby. | X | X | X |
| **E-mail**<br><br>Built-in e-mail client with inbox, outbox, compose, send and other functions. | X | X | X |

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| Feature | W900 | K600 | W550 |
|---|---|---|---|
| **EMS (Enhanced Messaging)**<br><br>Text messaging (SMS) with support for pictures and sounds. | X | X | X |
| **Exterior description**<br><br>Size mm | 109 x 24 x 49 | 104.3 x 18.9 x 45 | 93 x 46.5x 22.5 |
| **External Antenna Connector**<br><br>The phone has a built-in antenna with an external connector for use with an advanced car handsfree accessory. | X | X | X |
| **Fast port**<br><br>A system connector which enables faster data transfer between the phone and a computer. | X |  | X |
| **File manager**<br><br>Folder structure storage to help store and organize pictures, sounds and other phone content. | X | X | X |
| **FM radio**<br><br>FM radio with auto and manual search. The Radio Portable Handsfree is used as an antenna. | X | X (with RDS; radio data support) | X (RDS; radio data support) |
| **Games download**<br><br>Replace in-phone games with new ones. | X | X | X |
| **Games embedded** | X | X | X |
| **GPRS**<br><br>General Packet Radio Services - a communications standard enabling packet data transfer of 21,4 Kbit/s per timeslot (4+1 or 3+2). | X | X | X |
| **High Speed Data**<br><br>HSCSD - a communications standard enabling GSM data transfer 14.4 - 28.8 kbps. | X | X | X |
| **Icon Desktop 12**<br><br>A graphic icon desktop with 12 interactive icons. | X | X | X |

| Feature | W900 | K600 | W550 |
|---|---|---|---|
| **Infrared port**<br><br>A wireless connector enabling to connect the phone to a laptop or other infrared device in order to share pictures, synchronize or use the phone as a modem. | X | X | X |
| **Instant messaging (Wireless Village)**<br><br>Chat - several people can take part in a mobile messaging session. | X | X | X |
| **Internet key**<br><br>A dedicated internet button. Press once and the phone connects to a pre-set home page. | X | | X |
| **Java™**<br><br>Support for J2ME™ technology | Java 2, Micro Edition (J2ME™), Java 3D™ | Java 2, Micro Edition (J2ME™), Java 3D™ | Java 2, Micro Edition (J2ME™), Java 3D™ |
| **Keypad** | 16 keys, 4+1 way navigation, volume side keys, WALKMAN™ key, separate on/off, media key, camera key, operator key, video call key, Internet key, activity menu key, slide lock key. | 17 keys, joystick, volume side keys, video call key, separate on/off, activity menu key, camera key. | 12 keys, 4+1 way navigation, volume side keys, WALKMAN™ key, separate on/off, play/pause key, camera key, operator key, 2 selection keys, clear and back keys, 2 game keys, slide lock key. |
| **Keypad lock**<br><br>Lock the phone keys so they do not activate a function in the phone. | X | X | X |
| **LED flash light**<br><br>The LED flash light works in three ways; with still pictures as a flash, with the video camera as a fixed light and as a flash light using the light application. | X | X | X |
| **Lunar calendar**<br><br>A calendar system used in China and other parts of Asia. A lunar month is determined by the period required for the moon to complete its full cycle of 29.5 days. | X | X | X |

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| Feature | W900 | K600 | W550 |
| --- | --- | --- | --- |
| **Macromedia® Flash Lite™**<br><br>For impressive animated wallpapers, menus and other graphic elements. | X | X | X |
| **Mega Bass™**<br><br>An audio feature which enhances bass frequencies for better overall music experience. | X | X | X |
| **Memory**<br><br>Built-in user-free phone memory | 470 MB | 33 MB | |
| **Memory Stick Duo slot**<br><br>Slot for inserting a mini peripheral storage device (up to 2GB). Compatible with many cameras, computers and other devices. | X | | |
| **Menu shortcuts**<br><br>A function making it possible to dedicate shortcuts to the most-used phone functions. | X | X | X |
| **MMS (Multimedia messaging)**<br><br>Picture messaging with text and sound | X | X | X |
| **MMS video**<br><br>Support in the phone for sending video using MMS | X | X | X |
| **Modem**<br><br>GSM Internet dial-up support | X | X | X |
| **Music mode**<br><br>All radio transmitters and receivers are inactivated, making it possible to use the phone only as a WALKMAN$^{TM}$ in airplanes, hospitals, and other situations where using a mobile phone is not allowed. | X | | X |
| **Music tones**<br><br>Music tones, also called master tones, are DRM protected music by original artists. Various digital audio formats are supported. | X | X | X |

| Feature | W900 | K600 | W550 |
|---|---|---|---|
| **MusicDJ™**<br><br>A sampler music tool with MIDI drum, guitar, keyboard, bass and brass loops in different music styles, which can be combined to create polyphonic ringtones. | X | X | X |
| **Networks** | UMTS 2100, GSM (R99) 900, 1800, 1900, E-GSM 900 | UMTS 2100, GSM (R99) 900, 1800, 1900, E-GSM 900 | GSM (R99) 900, 1800, 1900, E-GSM 900 |
| **One-push open**<br><br>Quick access to keypad with automatic swivel function. | X | | |
| **OTA settings**<br><br>WAP, e-mail and other settings can be sent Over-The-Air to the phone. | X | X | X |
| **PhotoDJ™**<br><br>A drawing tool in the phone where new pictures can be drawn from scratch and existing pictures and photos can be altered. | X | X | X |
| **Picture gallery**<br><br>A thumbnail image gallery where sections of several pictures can be seen in the display at the same time. | X | X | X |
| **Picture phone book**<br><br>Add pictures to the contacts. When someone calls, a picture of that person appears on screen. | X | X | X |
| **PlayNow™**<br><br>Listen to music before you purchase and download to your phone. | X | X | X |
| **PlayNow™ Games**<br><br>Preview games straight from the phone desktop in three clicks before you purchase and download. | X | | X |
| **Polyphonic voices** | 72 | 72 | 40 |
| **Predictive text input** | X | X | X |

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| Feature | W900 | K600 | W550 |
|---|---|---|---|
| **QuickShare™**<br><br>QuickShare™ is easy experience sharing. With an integrated camera a view can be captured and sent in seconds. | X | X | X |
| **Screensaver** | X | X | X |
| **SIM card lock**<br><br>The possibility to protect the SIM card with a four-digit PIN code. | X | X | X |
| **SMS long (Text Messaging)**<br><br>Concatenated SMS text messaging. | X | X | X |
| **Sony Ericsson Remote Update Service**<br><br>Download the latest operator approved version of the mobile phone software over the air. | X | | X |
| **Sony Ericsson Update Service**<br><br>Connect the phone to an Internet - connected computer, download the latest operator-approved version of the mobile device software from the web, www.SonyEricsson.com/support and update the mobile device. | X | X | X |
| **Sound recorder**<br><br>A mini recording device in the phone that can record voice messages or other sounds. | X | X | X |
| **Speakerphone** | X | X | X |
| **Speed dialling**<br><br>Allocate contacts in the phone book to specific keys on the keypad | X | X | X |
| **Standby Time** | Up to 370 hours | Up to 370 hours | Up to 400 hours |
| **Status view**<br><br>The display shows the network being used, time and other status information | X | X | X |
| **Radio Portable Handsfree**<br><br>The WALKMAN™ and the radio can be controlled with the Radio Portable Handsfree. | X | | |
| **Stopwatch** | X | X | X |

| Feature | W900 | K600 | W550 |
|---|---|---|---|
| **SVG Tiny 1.1**<br><br>Scalable Vector Graphics for impressive animated wallpapers, menus and other graphic elements. | X | X | X |
| **Synchronization PC**<br><br>Synchronize and share phone content with a computer. | X | X | X |
| **SyncML**<br><br>A device communications standard that enables remote synchronization between devices. | SyncML 1.2 | SyncML 1.1.2 | SyncML 1.2 |
| **System connector cover** | X | | |
| **Talk Time** | Up to 8.40 hours | Up to 8.25 hours | Up to 9 hours |
| **Tasks**<br><br>Keeps track of important things to do. | X | X | X |
| **Themes display**<br><br>Phone menu texts and background graphics. | X | X | X |
| **Timer**<br><br>Set the phone to alert after a specific time lapse. | X | X | X |
| **Twin camera**<br><br>Two cameras - a video camera optimized for video calling located above the main display and an outside camera capable of taking still pictures and recording video. | X | X | |
| **UMTS**<br><br>A 3G technology standard capable of data transfer 384 kbps. | X | X | |
| **USB connectivity support**<br><br>Connect the phone to a computer with the provided USB cable and the memory in the phone appears on the computer screen as a mass storage device. | X | | X |
| **Vibrating alert**<br><br>The phone vibrates when a call comes in. | X | X | X |

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| Feature | W900 | K600 | W550 |
|---|---|---|---|
| **Video player**<br><br>Record, play and transfer video clips to another phone or a computer via available transfer method. | X | X | X |
| **Video streaming**<br><br>Real time streaming of video, for example, live cam. Media can also be downloaded and saved in the phone memory. | X | X | X |
| **Video call talk time**<br><br>When making a video call, the recipient can be seen in the display. The service requires UMTS/WCDMA. | Up to 1.60 hours | Up to 2.17 hours | |
| **VideoDJ™**<br><br>Create video sequences by combining different clips and adding music and images. | X | X | X |
| **Viewfinder display**<br><br>When using an in-phone camera or snap-on accessory camera, the picture can be previewed before it is captured. | X | X | X |
| **Voice control**<br><br>Voice answer, reject and call. Assign voice commands to items in the phone book and when a call is made, the voice command can be used instead of pressing keys. | X | X | X |
| **Voice mail**<br><br>Support for voice mail operator service including automatic answering and message recording. | X | X | X |
| **WALKMAN™ player**<br><br>Advanced digital music player. It is possible to play music and video clips, streamed or downloaded and the folder system enables, for example, organizing favourite songs into groups and creating simple playlists. A play and pause function simplifies listening. | X | | X |

| Feature | W900 | K600 | W550 |
|---|---|---|---|
| **WALKMAN™ key**<br><br>Get direct access to you music files without having to browse the menus. Press the WALKMAN<sup>TM</sup> key to gain direct access to the WALKMAN<sup>TM</sup> player. | X | | X |
| **WAP 1.2.1**<br><br>A mobile Internet standard to access specially designed Internet sites. | X | X | X |
| **WAP 2.0 XHTML**<br><br>A mobile Internet standard to access specially designed Internet sites. WAP 2.0 supports color and interactive lists. | X | X | X |
| **Weight** | 148 g | 105 g | 120 g |
| **WTLS**<br><br>Wireless Layer Transmission Security - encrypts confidential information such as credit card and bank account numbers. Necessary for mobile banking and shopping. | X | X | X |

# Facts and figures

This chapter offers readers a detailed listing of all the technical data relating to the product. Comprehensive descriptions of performance and technical characteristics are presented in table format for quick and easy access.

# Technical specifications

## General technical data

| | |
|---|---|
| System | Tri-band GSM Release 99 recommendations. GSM 900, GSM 1800, EGSM and WCDMA FDD mode supported, GSM 1900 and e-GSM mode supported. |
| Speech coding | HR, FR, EFR, AMR supported where available, for high speech quality. |
| GSM SIM/ UMTS USIM card | GSM SIM - GSM 11.11, UMTS SIM - 3GPP™ TS 31.102. Small plug-in card, 1,8 V and 3 V. |
| Memory | User-free memory 470 MB |
| Data transfer speeds | Up to 384 kbps (downlink) Up to 128 kbps (uplink) |

## Performance and technical characteristics

| Dimension | GSM 900/ E-GSM 900 | GSM 1800 | GSM 1900 | WCDMA |
|---|---|---|---|---|
| Frequency range (MHz) | TX: 880 – 915 RX: 925 – 960 | TX: 1710 – 1785 RX: 1805 – 1880 | TX:1850 –1910 RX:1930 – 1990 | TX:1920 – 1980 RX:2110 – 2170 |
| Channel spacing | 200 kHz | 200 kHz | 200 kHz | 5 MHz with 200 kHz channel rasters |
| Number of channels | 174 Carriers *8 (TDMA) | 374 Carriers *8 (TDMA) | 299 Carriers *8 (TDMA) | 277 |
| Modulation | GMSK | GMSK | GMSK | QPSK |
| TX Phase Accuracy | < 5° RMS Phase error (burst) | < 5° RMS Phase error (burst) | < 5° RMS Phase error (burst) | Error Vector Magnitude: <17.5% |
| Duplex spacing | 45 MHz | 95 MHz | 80 MHz | 190 MHz |
| Frequency stability | +/- 0.1ppm | +/- 0.1ppm | +/- 0.1ppm | +/- 0.1 ppm |
| Voltage operation (nominal) | 3.6 V | 3.6 V | 3.6 V | 3.6 V |
| Transmitter RF power output | 33 dBm Class 4 (2 W peak) | 30 dBm Class 1 (1 W peak) | 30 dBm Class 1 (1 W peak) | 24dBm Class 3 (0.25 W peak) |
| Transmitter Output impedance | 50 ohm | 50 ohm | 50 ohm | 50 ohm |

| Dimension | GSM 900/ E-GSM 900 | GSM 1800 | GSM 1900 | WCDMA |
|---|---|---|---|---|
| Transmitter Spurious emission (according to specification) | < -36 dBm up to 1 GHz<br>< -30 dBm over 1 GHz | < - 30 dBm | < - 30 dBm | < -36 dBm up to 1 GHz<br>< -30 dBm over 1 GHz (according to 3GPP™ spec.) |
| Receiver RF sensitivity | Better than – 102 dBm | – 102 dBm | – 102 dBm | Better than -106.7 dBm @ 12.2 kbps CS voice |
| Receiver RX Bit error rate | < 2.4% | < 2.4% | < 2.4% | < 0.1% |

# USSD technical data

| Feature | Support |
|---|---|
| USSD support | GSM Phase 1/2 (Cross-phase compatibility) |
| Mode support -mode | UI-mode supported<br>SAT initiated USSD supported |
| UI-mode details | • It is possible to scroll the text up and down in USSD messages.<br>• It is possible to highlight embedded numbers and take actions accordingly. |

# GPRS technical data

| Dimension | Support |
|---|---|
| Compatible GPRS and SMG specifications | Release 99 according to ETSI specification |
| Data rates | Multislot class 10 supported (4+2)<br>CS-1, CS-2, CS-3, CS-4<br>9,050 bps, 13,400 bps, 15,600 bps, 21,400 bps supported (network-dependent). |
| Medium Access Modes | Dynamic allocation |
| Support of Packet Control Channels (PBCCH/PCCCH) | Yes |
| Network operation mode | NOM I, II, III |
| Support of GPRS/CS combined procedures | Yes |
| Network control mode | NC0 and 2 |

| Dimension | Support | |
|---|---|---|
| Support of access in 2 phases | Yes | |
| Support of PRACH on 11 bits | Yes | |
| Support of GPRS re-selection C31/ C32 | Yes | |
| Support of static and dynamic addressing | Yes | |
| Support of power control Uplink and Downlink | Uplink = yes, Downlink is a network feature. | |
| Support of ciphering algorithms | GEA1, GEA2 | |
| Support of compression algorithms | Yes, V42bis and IP header compression. | |
| Mode of operation | Class B and Class C modes of operation supported. | |
| R Reference point | Physical layer: Support of RS232 PPP is supported as L2 layer in the R reference point Authentication algorithms PAP, CHAP supported | |
| IP connectivity | PDP type IP is supported IP termination in mobile or TE (laptop, PDA) supported | |
| PDP context | 10 PDP context descriptions stored in mobile PDP context description is edited via application in mobile, AT-command or via OTA Simultaneous PDP contexts are supported, maximum 2. | |
| SIM | GPRS aware, as well as non-GPRS aware; SIM cards are supported. | |
| AT commands supported | AT+CGDCONT - DEFINE PDP CONTEXT AT+CGEQREQ - Quality of Service Profile (REQUESTED) AT+CGEQMIN - Quality of Service Profile (Minimum Acceptable) AT+CGATT - PACKET DOMAIN SERVICE ATTACH OR DETACH | AT+CGACT - PDP CONTEXT ACTIVATE OR DEACTIVATE AT+CGDATA - ENT |

# SIM AT services supported

| Service | Mode | Support |
|---|---|---|
| CALL CONTROL BY SIM | | Yes |
| MO SMS CONTROL | | No |
| DATA DOWNLOAD TO SIM | Cell Broadcast SMS | Yes Yes |

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| Service | | Mode | Support |
|---------|---|------|---------|
| DISPLAY TEXT | | Text of up to 240 characters (120 UCS2 coded). | Yes |
| | bit 1: | 0 = normal priority | Yes |
| | | 1 = high priority | Yes |
| | bit 8: | 0 = clear message after a delay | Yes |
| | | 1 = wait for user to clear message | Yes |
| GET INKEY | | General: The GET_INKEY requires that the user confirms his/her choice | Yes |
| | bit 1: | 0 = digits (0-9, *, # and +) only | Yes |
| | | 1 = alphabet set | Yes |
| | bit 2: | 0 = SMS default alphabet | Yes |
| | | 1 = UCS2 alphabet | Yes |
| | bit 3: | 0 = character sets defined by bit 1 and bit 2 are enabled | Yes |
| | | 1 = character sets defined by bit 1 and bit 2 are disabled and the Yes/No response is requested | Yes |
| GET INPUT | | General: No. of hidden input characters | 252 |
| | bit 1: | 0 = digits (0-9, *, # and +) only | Yes |
| | | 1 = alphabet set | Yes |
| | bit 2: | 0 = SMS default alphabet | Yes |
| | | 1 = UCS2 alphabet | Yes |
| | bit 3: | 0 = ME may echo user input on the display | Yes |
| | | 1 = user input not to be revealed in any way (see note) | Yes |
| | bit 4: | 0 = user input to be in unpacked format | Yes |
| | | 1 = user input to be in SMS packed format | Yes |
| | bit 8: | 0 = no help information available | Yes |
| | | 1 = help information available | Yes |
| LAUNCH BROWSER | | | Yes |
| MORE TIME | | | Yes |
| PLAY TONE | | | Yes |
| POLLING OFF | | | Yes |
| POLL INTERVAL | | | Yes |

| Service | Mode | | Support |
|---|---|---|---|
| PROVIDE LOCAL INFORMATION | '00' = Location Information (MCC, MNC, LAC and Cell Identity) | | Yes |
| | '01' = IMEI of the ME | | Yes |
| | '02' = Network Measurement results | | Yes |
| | '03' = Date, time and time zone (DTTinPLI) | | Yes |
| | '04' - Language setting | | Yes |
| | '05' - Timing setting | | Yes |
| REFRESH | General: The reset option requests the user to wait while the phone restarts | | Yes |
| | '00' =SIM Initialization and Full File Change Notification | | Yes |
| | '01' = File Change Notification | | Yes |
| | '02' = SIM Initialization and File Change Notification | | Yes |
| | '03' = SIM Initialization | | Yes |
| | '04' = SIM Reset | | Yes |
| SELECT ITEM | | | Yes |
| SEND DTMF | | | Yes |
| SEND SHORT MESSAGE | bit 1: | 0 = packing not required<br>1 = SMS packing by the ME required | Yes<br>Yes |
| SEND SS | | | Yes |
| SEND USSD | | | Yes |
| SET UP CALL | | General: Capability configuration<br>Set-up speech call CallParty<br>Subaddress DTMF support | Yes<br>No<br>Yes |
| | | '00' = set up call, but only if not currently busy on another call | Yes |
| | | '01' = set up call, but only if not currently busy on another call, with re-dial | Yes |
| | | '02' = set up call, putting all other calls (if any) on hold | Yes |
| | | '03' = set up call, putting all other calls (if any) on hold, with re-dial | Yes |
| | | '04' = set up call, disconnecting all other calls (if any) | Yes |
| | | '05' = set up call, disconnecting all other calls (if any), with re-dial | Yes |

| Service | Mode | Support |
|---|---|---|
| SET UP EVENT LIST | '00' = MT call | Yes |
| | '01' = Call connected | Yes |
| | '02' = Call disconnected | Yes |
| | '03' = Location status | Yes |
| | '04' = User activity | Yes |
| | '05' = Idle screen available | Yes |
| | '06' = Card reader status | Not Applicable |
| | '07' = Language selection | Yes |
| | '08' = Browser termination | Yes |
| | '09' = Data available | No |
| | 'OA' = Channel status | No |
| SET UP IDLE MODE TEXT | | Yes, 1 row of text is supported |
| SET UP MENU | | Yes |
| TIMER MANAGEMENT | | Yes |
| OPEN CHANNEL | | No |
| CLOSE CHANNEL | | No |
| RECEIVE DATA | | No |
| SEND DATA | | No |
| GET CHANNEL STATUS | | No |

## User Interaction with SIM AT

### Display text

Text of up to 240 characters (120 UCS coded) is supported.

Text clearing times are 5-20 seconds and a 60-second time-out limit for the user to clear the text. 'Key' responses:

- 'Long Back' – Proactive session terminated by user.
- 'Back' – Backward move in proactive session.

Any other key clears the display if the command is performed successfully.

### Get inkey

Prompt for a one-character input. Pressing 'Ok' without entering a character gives warning message "Minimum 1 character". 'Key' responses:

- 'C' clears current character.
- 'Long Back' terminates the proactive session.
- 'Back' – Backward move in proactive session.
- 'OK' – Command performed successfully.

## Get input

Prompt for character input. The phone will refuse to accept further input when maximum response length is exceeded. UI Maximum Response lengths:

- Digits Only – 160 characters.
- SMS default alphabet characters – 160 characters.
- Hidden Characters (digits only) – 20 characters.

'Key' responses:

- 'C' clears current character.
- 'Long Back' terminates the proactive session.
- 'Back' – Backward move in proactive session.
- 'OK' – Command performed successfully.

## Select item

Scroll to highlight item for selection. 'Key' responses:

- Navigational key press down – Scroll down list.
- Navigational key press up – Scroll up list.
- Long 'Back' terminates proactive session.
- 'Back' – Backward move in proactive session.
- 'OK'– Command performed successfully.

## Send short message

Default message "Sending message, please wait" can be replaced for the Alpha Identifier text, or suppressed completely if a null text is provided. Default responses are "MESSAGE FAILED" or "MESSAGE SENT". 'Key' responses:

- Long 'Back' or 'Back' ends the proactive session.

## Set up call

If the ME is on a call when the command 'Set up Call', 'putting all other calls on hold' is sent, the user will see the text 'Setting up a call current call will be held'. If 'OK' is pressed the current call will be put on hold and the new call set up. If the ME is on a call when the command 'Set Up Call, disconnecting all other calls' is sent, the user will see the text 'Setting up a call current call will be disconnected'. If the 'OK' key is pressed the current call will be disconnected and the new call set up.

## Set up menu

Incorporates a SIM Application Toolkit Menu Item into the ME's main menu structure.

If an Alpha Identifier is supplied in the Set Up Menu command, this is used as the SIM AT entry in the ME's main menu. If no alpha identifier is supplied and several items are found in the menu, a default title is used. If the SIM AT Menu Item is selected by pressing 'Select', all the items sent in the Set Up Menu command will be available for selection, in the same way as the Select Item command.

# Entertainment

## WALKMAN ™

| File types | Formats | Extensions |
| --- | --- | --- |
| Audio | AAC<br>AAC+<br>MP3 (192 kbit/s for local playback)<br>MP4<br>M4A<br>3GP<br>AMR<br>WAV<br>G-MIDI (level 1 with 40 voices polyphony)<br>Real 8 | .mp4, .3gp<br>.mp4, .3gp<br>.mp3<br>.mp4<br>.m4a<br>.3gp<br>.amr<br>.wav<br>.mid |
| Video<br>(including audio part) | MP4 (video: MPEG4, audio: AAC or AMR)<br>3GP (video: MPEG4 or H.263, audio: AAC or AMR)<br>Real 8 | .mp4<br>.3gp |
| Streaming transport | RTSP according to 3GPP™ | |
| Video coding | MPEG-4 Simple Visual Profile Level 0<br>H.263 Profile 0 Level 10, Real 8 | |
| Audio decode | AAC, AMR, MPEG Layer 3, Real 8 | |
| Features | Automatic loop of songs in folder<br>Automatic pause on telephone call. | |
| Ringtone file formats | MIDI (General MIDI 1, SP-MIDI)<br>E-Melody<br>I-Melody<br>AMR-NB<br>MP3<br>MP4<br>3GP<br>M4A<br>WAVE<br>RHZ<br>XMF | |

# Imaging/Messaging

## 2.0 Megapixel camera

| Facts and figures | |
|---|---|
| Picture sizes (resolution) | 160 x 120 pixels (QQVGA)<br>640 x 480 pixels (VGA)<br>1632x1280 pixels (2.0 Megapixel) |
| Colour depth | 24 bit (8 bit per RGB channel), 262k colours |
| Camera memory | Using phone memory or memory stick;<br>no memory dedicated to the camera only. |
| Digital zoom | 8 x zoom |
| LED flash light | Yes (On, Off, Auto) |
| Auto focus | Yes |
| Night mode | Yes |
| Self-timer | Yes |
| Effects | Negative/ Solarize/ Sepia/ Black&White/ Off |
| White balance | Auto/ Incandescent/ Fluorescent/ Daylight/ Cloudy |
| Picture quality | Choose between Normal and Fine |
| Time and date | Add a time and date to a picture |
| Macro setting | Yes |
| Self-portrait mode | Yes. Take a picture/video recording of yourself with the video call camera. |
| Spot photometry | Yes |
| **Video recorder** | |
| Video sizes | 320 x 240 pixels |

## Video call camera

| Facts and figures | |
|---|---|
| Picture sizes (resolution) | 176 x 144 pixels (QCIF)<br>128 x 96 pixels (SQCIF) |
| Digital zoom | Back camera: 4x zoom, Front camera: 2x zoom |
| Night mode | Yes |
| White balance | Auto |

| Facts and figures | |
|---|---|
| Brightness | Yes |
| Camera quality | Smooth/Normal/Sharp |
| Video coding | H.263 (Profile 0) MPEG4 |
| Audio decode | AMR |

# Pictures and animations

| Formats | JPEG, BMP, GIF (including animated), PNG, WBMP, Macromedia® Flash® and Scalable Vector Graphics |
|---|---|
| Sharing via | IR, Bluetooth™, MMS, email, computer file transfer or Cable. |

# Image decoders

| Decoder | Details | Size | Colour depth | File format |
|---|---|---|---|---|
| GIF | 87a/89a | | | |
| JPEG | ISO/IEC JPEG Baseline DCT Progressive DCT Non-differential Huffman coding Symbol 'SOF2' | VGA. Decode maximum size 2000 x 2000. | | JFIF v1.02 EXIF |
| BMP | The bitmap image format used by Windows®. | XRAM dependent, default is VGA | 24 bit | |

# Image encoders

| Decoder | Details | Size | Colour depth | File format |
|---|---|---|---|---|
| GIF | 89a | | | |
| JPEG | ISO/IEC JPEG Baseline DCT Non-differential Huffman coding Symbol 'SOF0' | VGA. Encode maximum size 2M pixel. | | JFIF v1.02 |
| BMP | The bitmap image format used by Windows®. | XRAM dependent, default is VGA | 24 bit | |
| WBMP | | | | |

# Short Messaging Service

| Feature | Support |
|---|---|
| SMS Centre Number | It is possible to pre-load the SMS Centre Number. |
| Pictures | It is possible to insert a picture or an icon into the text message. EMS compliant mobile handsets will be able to see the picture correctly. |
| Input methods | Predictive text input and multitap. |
| Reply to messages | It is possible to reply to received messages by SMS, phone call or email. |
| Message creation methods support | Predictive writing and multitap. |
|     Copy and paste words | Yes |
|     Teaching of predictive words that are not in the predictive dictionary | Yes |
| Possibilities when creating a message: | |
|     save a sent message in a "Sent items" folder | Yes |
|     insert a line in the message | Yes |
|     assign a validity period to the message | Yes |
|     use pre-defined messages | Yes |
| Possibilities when receiving a message: | |
|     reply to the sender | Yes (only to the sender, not to all or part of the message recipients). |
|     forward the message | Yes |
|     save the message on SIM | Yes |
|     get delivery time and date | Yes |
| Possibilities of the previously sent message: | |
|     delivery report of the message | Yes |
|     forward the message | Yes |
|     save the message on SIM | Yes |
|     know the remaining capacity storage | Yes |
| Possibilities of the previously received message: | |
|     reply to the sender | Yes (only to the sender, not to all or part of the message recipients). |
|     save the message in the Inbox | Yes |
|     forward the message | Yes |

| Feature | Support |
| --- | --- |
| know the remaining capacity storage | Yes |
| Supported ways for replying to a received SMS: | |
| via SMS | Yes |
| via phone call (set up a call to the number contained in the message body) | Yes |
| via WAP call (go to the WAP address contained in the message body) | Yes |
| via USSD session | No |
| Print via infrared | No |
| Possibility to offer the user the ability of sending an SMS to a list of recipients | Yes, using groups in Contacts. |
| Possibility to write an email address as a recipient address | Yes, if SMS type = email. |
| SMS storage | On the SIM and in the phone. |
| Nokia Picture Messaging | Yes |

# Enhanced Messaging Service

| Feature | Support |
| --- | --- |
| Level of compliance supported by the handset regarding the specifications described in release 99. | Enhanced Messaging Service (EMS) according to the standard 3GPP™ TS 23.040 v4.3.0, with the addition of the ODI feature from 3GPP™ TS 23.040 v5.0.0. |
| Number of messages that the handset is able to handle to generate a concatenated message | 20 |
| Capacity storage | 100 and the space left on the SIM card. |
| Outgoing messages | It is possible to...<br><br>• see how many short messages an EMS message consists of before sending it.<br>• choose whether to send the message or not after writing it. |
| Incoming messages | • A signal is heard once all parts of the message have been received or when a timeout occurs.<br>• It is possible to re-use the content of an EMS message. Sounds, pictures, and animations can be inserted in a new message, if the object is not protected using ODI. |

| Feature | Support |
|---|---|
| Concatenated messages | A receipt is received in the handset when all parts of a concatenated message have been delivered. |
| Insert objects | It is possible to add pictures, animations and sounds to an EMS message. |
| Text formatting | • Centred, left and right aligned text.<br>• Small, normal and large font size.<br>• Bold, italic, underlined and strikethrough style. |
| Sounds | Chimes high, chimes low, ding, tada, notify, drum, claps, fanfare, chords high, chords low. |
| I-melody | Yes, version 1.2. |
| Melodies | It is possible to...<br><br>• send and receive melodies via EMS, if the melodies are not protected by copyright.<br>• download melodies and commercial tunes from WAP/WAP portals.<br>• create melodies on WAP/WAP portals. |
| WBMP | Yes |
| Picture sizes | 16x16 mm, 3x32 mm, variable size in black and white. |
| Pictures | It is possible to...<br><br>• edit pictures by using the phone keypad.<br>• send and receive pictures via EMS, if the pictures are not protected by copyright.<br>• create pictures on WAP/WAP portals.<br>• download pictures from WAP/WAP portals.<br>• receive pictures in enhanced messages originated by service providers. |
| Animations | The handset supports the following animations: Angry, Crying, Flirty, Happy, Kiss, Sad, Tongue, Wow, Confused, Devil, Glasses, Indifferent, Laughter, Sceptical and Wink. Plus the other nine animations defined in 3GPP™ TS 23.040 v4.3.0.<br><br>It is possible to...<br><br>• send and receive animations. |
| TP-PID field value given by the handset before sending an EMS message | 0x00 |

# Multimedia Messaging Service

| Feature | Support |
| --- | --- |
| MMS/CSD parameters and MMS/GPRS parameters placement | MMS is bound to a WAP profile. A WAP profile is bound to a Data Account. A Data Account contains either CSD parameters or GPRS parameters. |
| Possibility to pre-configure the MMS parameters in factory | • MMS/CSD: Yes<br>• MMS/GPRS: Yes |
| Possibility to configure the MMS parameters by OTA provisioning | • MMS/CSD: Yes<br>• MMS/GPRS: Yes |
| Possibility for all the parameters from the parameters set to be OTA provisioned at the same time | • MMS/CSD: Yes<br>• MMS/GPRS: Yes |
| Possibility for only one parameter from the parameters set to be OTA provisioned | • MMS/CSD: No<br>• MMS/GPRS: No |
| OTA provisioning solution | OTA Settings Specification v7.1 © Ericsson and Nokia |
| Supplier indication of realized interoperability tests between its MMS User Agent and MMS Relay/Server from other suppliers | Yes |
| Support of a standard or a proprietary procedure for OTA provisioning of MMS parameters | Proprietary |
| Functionalities that the user is able to set during message composition: | • message subject<br>• message priority<br>• email recipient address<br>• message Cc recipient(s) address(es)<br>• delivery report request<br>• read report request<br>• MSISDN recipient address |
| From where can the user insert multimedia elements into multimedia messages: | • File Manager<br>• directly from camera<br>• Contacts<br>• Calendar |
| Possibility for sent messages to be memorized into a folder in handset memory | Yes |
| Actions that the user can perform after message notification: | • Auto Download<br>• Always Ask |
| Actions that the user can perform after message retrieval: | • reply to the sender of the message SMS/MMS<br>• reply to the sender and to Cc people SMS/MMS<br>• forward the message MMS<br>• delete the message<br>• save message into terminal<br>• call the sender of a message |
| Multimedia codecs/formats supported for audio | AAC, AMR, MPEG Layer 3, Real 8 |

| Feature | Support |
|---|---|
| Multimedia codecs/formats supported for video | MPG4, 3GPP™, SDP, Real 8 |
| Multimedia codecs/formats supported for image | JPEG, GIF87, GIF89A, PNG, SVG, WBMP, BMP |
| Supported formats for message presentation: | • message body + attachments (email presentation)<br>• SMIL version as described in OMA MMS IOP document version 1.2 |
| Maximum message size that can be handled by the handset for message | Content Class and Creation mode are applied. Also maximum size is possible to customize. |
| MMS User Agent will report problems to user in case of: | • message not sent causes no user subscription to service, if included in ResponseText (please see WAP209)<br>• message not sent causes required functionality not supported by MMS Relay/Server, if included in ResponseText (please see WAP209)<br>• message not sent causes insufficient credit (in case of prepaid charging), if included in ResponseText (please see WAP209) |

# Connectivity

## Bluetooth™ technical data

| Dimension | Support |
|---|---|
| Bluetooth capability statement | This phone is manufactured to meet Bluetooth Specification 2.0 |
| Bluetooth functions | Basic Imaging Profile<br>Dial-up Networking Profile<br>File Transfer Profile<br>Generic Access Profile<br>Generic Object Exchange Profile<br>Handsfree Profile<br>Headset Profile<br>Human Interface Device (HID) Profile<br>JSR-82 Java API<br>Object Push Profile<br>Personal Area Network Profile<br>Serial Port Profile<br>Synchronization Profile<br>SyncML OBEX binding |
| Connectable devices | All products supporting Bluetooth spec. 1.1, or higher, and at least one of the profiles above. |

| Dimension | Support |
|---|---|
| Coverage area | Varies due to radio performance on remote device and the occurrence of obstacles. Up to 10 metres (33 feet). |
| Transmission power | 2mW (3 dBm) |
| Frequency band | 2.4 GHz - the unlicensed ISM band. |
| Power consumption | GSM host processor excluded:<br>• Standby, Bluetooth On mode: <0.9mA<br>• Voice mode: 24 mA<br>• Data mode average: 25mA |
| Data transmission rate | Up to 600 kbps asynchronous and up to 350 kbps synchronous from an application level. |

# SyncML technical data

| Feature | Support for SyncML |
|---|---|
| SyncML compliance | The handset is fully SyncML 1.2 compliant (it passed SyncML Conformance testing). SyncML 1.1.2 is not supported. |
| Basic data formats | Contacts: vCard 2.1, Calendar: vCalendar 1.0 (vEvent), Tasks: vCalendar 1.0 (vTodo) v1.0, Notes: text/plain |
| Possibility for operators to extend SyncML functionality. | No |
| Possibility to synchronize other handsets using SyncML. | No |
| Transport method for SyncML messages. | Bluetooth |
| Synchronization application placement. | Inside the handset. |
| Possibility for the user to configure login parameters (for example, username and password) to access the remote database. | Yes |
| Configuration parameters that can be entered/modified by the user. | (Calendar, Contacts, Tasks and Notes) UserID and PWD for Databases, Databases to be synchronized (on/off), Internet profile, Synchronization interval, Server ID and Server PWD. Can be provisioned with Ericsson Nokia OTA Settings Specification v7.1, OMA Client provisioning v1.1, and OMA Device Management 1.1.2. |
| Mechanisms used by the handset to capture changes made by the end user (i.e. how does the SyncML client in the handset know which changes were made to the address book). | It uses a change log where it marks the contact as updated. |

| Feature | Support for SyncML |
|---|---|
| Ability to deal with multiple servers. | Yes |
| Ability to perform conflict resolution actions. | No |

# Web browser technical data

| Feature | Support in the browser |
|---|---|
| Back to previous page | Yes |
| Bearer type GPRS | Yes |
| Bearer type GSM Data | Yes, HSCSD, ISDN and analog. |
| Bookmarks | Yes, with folders and sorting supported. |
| Bookmark Export/Import | Yes, can be sent and received using vBookmark format via Infrared, Bluetooth™, SMS, MMS and email. |
| Cache | Yes (size 300 kB). |
| Character sets * | UTF-8 (Default), UTF-16, USASCII, Latin1, UCS2.<br><br>*) When creating WML applications, it is recommended to always save the page contents as UTF-8, and that this is clearly indicated in the pages before publishing. This ensures that the contents of the application can be viewed, regardless of character sets used in gateways and the phone. All characters are not supported in all phones. The software version depends on which market the phone is associated to. Also, please note that the phone may not support input on a WAP Service which uses certain characters (languages), even if those characters are supported for browsing in the phone. |
| Clear cache | Yes |
| Colour | Colour display |
| Home page | Yes, up to 10 different; one for each Internet profile. |
| HTML version for WAP browser | XHTML, Mobile Profile 1.2 |
| Hyperlinks in Text | Yes, highlighted as blue underlined text. |
| Hyperlinks in Images | Yes, indicated by a frame |
| Image Animation | Yes |
| Image Formats | GIF (interlaced and non-interlaced) WBMP, no transparent layers, JPEG, PNG, BMP and SVG. |
| Network Settings | Up to 10 different settings available by selecting WAP profile (Internet, Banking, Gateway etc.). |
| OTA Support | Yes |
| PPP Authentication | PAP, CHAP supported. |

| Feature | Support in the browser |
|---|---|
| Reload page | Yes |
| Security | WTLS class 1-3<br>TLS version 1, Client authentication<br>SSL version 3, Client authentication<br>WIM on SIM ICC<br>X.509 certificate support, WAP Profile<br>WPKI OTA download of trusted certificates |
| Tables | Yes |
| User Agent Profiles | Yes, list of client characteristics - for example display size. |
| WAP/WML WAP | WAP 2.0/WML 1.3 |
| Internet profiles | Dynamic - up to 10 WAP profiles, each with its own settings. |

# Operator technical data

| Feature | Support for browser | |
|---|---|---|
| **Web browser** | | |
| Version | 2.0 baseline | |
| HTML | XHTML Mobile Profile | |
| Access NetFront 3.3 | • HTML 4.01, XHTML 1.1 Including mobile phone<br>• CSS 1 & CSS 2 (Partial)<br>• ECMAScript 3rd edition (equal to Java script 1.5)<br>• DOM level1, level2 and Dynamic HTML (Partial)<br>• Graphis formats: GIF, Animated GIF, JPEG, progressive JPEG, PNG, MNG, BMP, WBMP | |
| **Provisioning** | | |
| **Provisioning types** | **The Ericsson-Nokia OTA solution**<br>Over the Air Settings Specification, v7.1<br>© Ericsson and Nokia | **OMA Client provisioning (v1.1)** |
| Total Parameter sets | 10 (shared between the WAP provisioning types).<br>< or = 10 (total number of WAP profiles). | |

| Feature | Support for browser | |
|---|---|---|
| Parameter set list | name,<br>homepage and homepage title (1st bookmark element),<br>proxy/GW address,<br>bookmarks (remaining bookmark elements),<br>CSD phone number,<br>CSD data rate,<br>CSD dial type,<br>GPRS APN,<br>protocol authentication,<br>GW authentication,<br>secure connection on/off | name,<br>homepage,<br>proxy/GW address,<br>CSD phone number,<br>CSD data rate,<br>CSD dial type,<br>CSD response timer,<br>GPRS APN,<br>protocol authentication,<br>GW authentication,<br>GPRS QoS |
| Parameter sets include | CSD, GPRS (different sets). | |
| Factory pre-configuration | CSD (possibility to lock a setting), GPRS. | |
| OTA | CSD, GPRS configuration possible. | |
| **Security mechanism** | | |
| **Bearer** | **The Ericsson-Nokia solution** | **OMA Client Provisioning** |
| OTA via SMS | Operator verification through a code that can be included in the OTA configuration data.<br>This code is shown to the user who can choose to install or not. | Uses security mechanism (SEC) methods according to WAP-183-ProvCont-20010724-a (see www.openmobilealliance.org). |
| **Interface** | | |
| **Bearer** | **The Ericsson-Nokia solution** | **OMA Client Provisioning** |
| OTA via SMS | A question whether to install, with the code if available is asked. The user may have to choose whether to create a new WAP profile or to replace an existing WAP profile. | For NETWPIN the user is asked to accept to install received settings. For USERPIN, USERNETWPIN and USERPINMAC the user is subsequently asked to enter a PIN code that is a shared secret between the service provider and the user. |
| OTA via Cell Broadcast | - | The user is asked whether to accept the received settings or not. |

| Feature | Support for browser | |
| --- | --- | --- |
| **Re-provisioning Interface** | **The Ericsson-Nokia solution** | **OMA Client Provisioning** |
| OTA via SMS | Same interface as above. | If the settings previously installed were privileged or have higher priority, the settings might not be possible to install again unless the terminal is reset, otherwise as above. |
| OTA via Cell Broadcast | - | If the settings previously installed were privileged or have higher priority, the settings might not be possible to install again unless the terminal is reset, otherwise as above. |
| Carrier reset/provisioning | Yes, but not if the set is pre-configured in the factory and locked. | |
| SWIM | Not used for provisioning. The SWIM is only used for WAP security, both WTLS connections and digital signatures. | |
| SWIM certificate | Both client and trusted certificates can be used for WTLS connections and digital signatures. | |
| **Applicative provisioning** | | |
| Preferred bearer customization | Yes | |
| Email customization | Yes, but not through Internet provisioning. | |
| Other applications/features | Yes (MMS, SyncML, Wireless Village). | |
| **Technologies** | | |
| OMA Client provisioning | Yes, WAP provisioning document v1.1. | |
| Openwave OTA | No | |
| Other | Yes. The Ericsson-Nokia solution. OTA Settings Specification v7.1. | |
| Provisioning bearer | SMS, Cell Broadcast | |
| Parameter sets available | < or = 10 (total number of Internet profiles) | |
| Parameter sets for OTA modification | < or = 10 (total number of Internet profiles) | |
| | | |
| **PUSH** | | |
| **Content types** | | |
| Service Indication (SI) | Yes | |
| Service Loading (SL) | Yes | |
| Cache Operation (CO) content type | Yes | |
| Session Initiation Application (SIA) | Yes | |

| Feature | Support for browser |
|---|---|
| **Man Machine Interface** | |
| SI/content retrieval postponing | Yes |
| SI menu structure accessability | Messaging, Inbox |
| SL reception warning | The user can make a choice if a dialogue is wanted or not before loading the SL.<br>Messaging/Settings/Push/Allow push msg/Always ask |
| SIA reception warning | Yes |
| Cache size limitations | The oldest push in the inbox will be discarded. |
| Number of push messages | Depending on the size of the push messages. Around 20 push messages with a size of 500 bytes can be stored. |
| Push de-activate | Yes (Messaging/Settings/Push/Allow push msg). |
| Dynamic push menu changes | No. There are no changes in the menus when activating/deactivating push. |
| **Security** | |
| Mechanisms for push | None |
| Trust with PPG | Sending a SIA is the most trustful. |
| WSP push sessions | The White List is supported. |
| Denial of service/spoofing | |
| **User agent profile** | |
| UA profile content sent at beginning of WSP session | No |
| OA profile content size | |
| URL sent pointing to the UA profile at the beginning of WSP session | Yes |
| URL location | On the manufacturer Internet site. |
| **WTAI** | |
| WTA Make Call | Yes |
| WTA Send DTMF | Yes |
| WTA Add Phone Book | Yes |
| **DOWNLOAD** | |
| HTTP GET solution to download content | Yes |
| Other download content | Yes. No download limit when using HTTP protocol. |
| Download application/product memory check | Yes |

| Feature | Support for browser |
| --- | --- |
| Downloaded object solution | Yes. The user is informed where the content is saved and asked if it should be used at once or later. |
| UAP indication for downloading | Yes |
| Other features | Yes. Store, delete, forward, use, manage. |
| Object formats | Formats supported in the phone. |
| **GRAPHICAL USER INTERFACE** | |
| **Man Machine Interface** | |
| Selection keys | Yes |
| Separate/dedicated back or erase keys | Yes |
| Display backlight on when browsing | Yes |
| Predictive writing | Yes |
| "http://" string displayed automatically when entering URLs | Not displayed but the "http://" is added automatically to the URL. |
| **Elements** | |
| Pop-up menus | Yes, in XHTML. |
| Radio buttons | Yes, in XHTML. |
| Check boxes | Yes, in XHTML. |
| Buttons | Available as XHTML form controls. |

# Java™

| Feature | Functionalities |
|---|---|
| **Java 2, Micro Edition (J2ME™)** | • CLDC 1.1 (JSR 139)<br>• MIDP 2.0 (JSR 118)<br>• Wireless Messaging API (JSR 120/205)<br>• Mobile Media API (JSR 135)<br>• Java™ Technology for the Wireless Industry (JSR 185)<br>• Java™ API for Bluetooth™ (JSR 82)<br>• PDA Optional Packages for J2ME™ Platform (JSR 75)<br>• Web Services (JSR 172) |
| **Java 3D** | • Mascot Capsule Micro3D Version 3<br>• Mobile 3D Graphics API for J2ME™ (JSR 184) |

# Abbreviations

**3GPP™**

3rd Generation Partnership Project

**AAC+**

Advanced Audio Coding

**AMR**

Adaptive Multi Rate.
Audio format for speech sounds.

**API**

Application Programming Interface

**CS**

Circuit Switched

**CSD**

Circuit Switched Data

**Deck**

A collection of WML cards.

**DRM**

Digital Rights Management; controlling copying
and distribution of contents, with respect to intel-
lectual property rights.

**DTMF or Touch Tone**

Dual Tone Multi-Frequency signal – codes sent as
tone signals. Used for telephone banking, access-
ing an answering machine, etc.

**e-GSM**

Extended GSM. New frequencies specified by the
European Radio Communications Committee
(ERC) for GSM use when additional spectrum is
needed (Network-dependent). It allows operators
to transmit and receive just outside GSM's core
900 frequency band. This extension gives
increased network capability.

**EFR**

Enhanced Full Rate, speech coding.

**EMS**

Enhanced Messaging Service. Allows the user to
add simple pixel pictures and animations, sounds
and melodies to a text message. The EMS 3GPP™
standard also includes text formatting.

**ETSI**

European Telecommunications Standards Institute.

**FM**

Frequency Modulation of the (radio) carrier wave.

**FR**

Full Rate, speech coding.

**GIF**

Graphics Interchange Format

**GPRS**

General Packet Radio Services

**GSM**

Global System for Mobile Communications. GSM
is the world's most widely-used digital mobile
phone system, now operating in over 100 countries
around the world, particularly in Europe and Asia-
Pacific.

The GSM system family includes GSM 850, GSM
900, GSM 1800 and GSM 1900. There are different
phases of roll-out for the GSM system and GSM
phones are either phase 1 or phase 2 compliant.

**HR**

Half Rate, speech coding.

**HSCSD**

High Speed Circuit Switched Data

**HTML**

HyperText Markup Language

**HTTP**

HyperText Transfer Protocol

**IrDA**

Infrared Data Association

**JPEG**

Joint photographer expert group

**MIDI**

Musical Instrument Digital Interface

**ME**

Mobile Equipment

**MMI**

Man-Machine Interface. See UI.

**MP3**

Short for "MPEG-1 layer 3", an effective audio coding scheme.

**MPEG4/MPG4**

MPEG-4 extends the earlier MPEG-1 and MPEG-2 algorithms with synthesis of speech and video, fractal compression, computer visualisation and artificial intelligence-based image processing techniques.

**MT**

Mobile Termination

**ODI**

Object Distribution Indicator

**OMA**

Open Mobile Alliance

**OTA**

Over-the Air Configuration. To provide settings for the phone by way of sending an SMS message over the network to the phone. This reduces the need for the user to configure the phone manually.

**PDA**

Personal Digital Assistant

**PDP**

Packet Data Protocol

**PIM**

Personal Information Management

**PNG**

Portable Network Graphic

**RTSP**

Real Time Streaming Protocol session control.

**SI**

Service Indication

**SL**

Service Loading.

**SIM card**

Subscriber Identity Module card – a card that must be inserted in any GSM-based mobile phone. It contains subscriber details, security information and memory for a personal directory of numbers. The card can be a small plug-in type or credit card-sized, but both types have the same functions. The phone uses the small plug-in card.

**SMS**

Short Messaging Service. Allows messages of up to 160 characters to be sent and received via the network operator's message centre to a mobile phone.

### SP-MIDI

SP-MIDI stands for Scalable Polyphony MIDI.

### SS

Supplementary Services

### SSL

Secure Socket Layer

### TLS

Transport Layer Security

### UI

User interface

### URL

Uniform Resource Locator.
The global address of documents and other resources on the World Wide Web.

### USSD

Unstructured Supplementary Services Data

### vCard

vCard automates the exchange of personal information typically found on a traditional business card, for use in applications such as Internet mail, voice mail, Web browsers, telephony applications, call centres, conferences, PIMs /PDAs, pagers, fax, office equipment, and smart cards. vCard is specified by IETF.

### VGA

Video Graphics Array

### WAP

Wireless Application Protocol. Handheld devices, low bandwidth, binary coded, a deck/card metaphor to specify a service. A card is typically a unit of interaction with the user, that is, either presentation of information or request for information from the user. A collection of cards is called a deck, which usually constitutes a service.

### WAP Application

A collection of WML cards, with the new context attribute set in the entry card.

### WAP service

A WML application residing on a web site.

### WAV

Windows media audio.

### WBMP

Wireless BitMap.
A graphic format optimized for mobile computing devices.

### WML

Wireless Markup Language. A markup language used for authoring services, fulfilling the same purpose as HyperText Markup Language (HTML) does on the World Wide Web (WWW). In contrast to HTML, WML is designed to fit small handheld devices.

### WMLScript

WMLScript can be used to enhance the functionality of a service, just as, for example, Java Script may be utilized in HTML. It makes it possible to add procedural logic and computational functions to WAP-based services.

### WSP

Wireless Session Protocol

### WTLS

Wireless Transport Layer Security

### WWW

World Wide Web

### XHTML

Extensible HyperText Markup Language

### XML

Extensible Markup Language

# Related information

## Documents

- Sony Ericsson User Guide
- Sony Ericsson FAQ
- AT Command Reference Manual
- WAP 2.0 Specifications

## Links

- www.SonyEricsson.com/
- www.ericsson.com/mobilityworld/
- www.midi.org
- www.extendedsystems.com
- www.gsmworld.com/
- www.bluetooth.com
- www.imc.org
- www.3gpp.org
- www.irda.org
- www.etsi.fr
- www.wapforum.org
- www.imc.org/pdi/
- www.syncml.org
- www.w3.org/TR/xhtml-basic/
- www.java.sun.com
- www.memorystick.org/
- www.memorystick.com/

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